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AFRICAN DEVELOPMENT BANK GROUP

Holding Excess Foreign Reserves Versus Infrastructure Finance: What should Africa do?

Cédric Achille MBENG MEZUI and Uche DURU¹

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Abstract

Financing infrastructure needs in Africa necessitates new thinking on financing mechanisms. This paper is a contribution to the debate on the use of excess foreign exchange reserves from different African countries as one of the funding sources for financing infrastructure. The study has: (i) extracted data on the foreign exchange reserve, debt and infrastructure needs of African countries from different IMF, World Bank and AfDB databases; (ii) estimated the adequacy level of foreign reserve for these countries based on two commonly used methodologies – the traditional metric method of import cover and the Wijnholds and Kapteyn (WK) method; (iii) then estimated the excess foreign reserve and the social cost of holding this excess based on comparison to other alternative

investment opportunities such as investments in African infrastructure. Based on these estimations, the study has shown that: (i) African countries have held excess reserves in the range of \$ 165.5 and \$ 193.6 billion on average per year between 2000 and 2011. This is more than the infrastructure financing gap identified at \$ 93 billion per year; and (ii) the social cost of holding these excess reserves amount to up to 1.65% in GDP terms on average. In addition, the study provides some suggestions on how central banks can innovate in their reserves management. A close collaboration between the central banks and the debt management offices on the alignment of foreign reserves and foreign debt is deemed crucial.

Keywords: African foreign exchange reserves; social cost; infrastructure finance

1.0 Introduction

“The value of this analysis of the funding of the reserves is that it enables the authorities to ascertain the true cost of holding reserves. If the reserves are treated simply as an asset portfolio with no funding or corresponding liabilities, the income on the reserves looks like a net gain for the authorities. An approach which takes into account the true method of funding the reserves will show that in many cases the net financial outcome from holding reserves may even be a loss, especially in those cases where comparatively low-yielding foreign assets are financed with higher-yielding domestic borrowings. And even a positive return may not be optimal; the key question is whether higher returns, after allowance for risk, could be made elsewhere (e.g through investment in the country’s domestic infrastructure).”²

Nations differ in a number of factors including population size, institutions, state of development, wealth, etc. Governments know that better quality infrastructure investment is an important way to boost improvements in growth and productivity. This is why addressing the constraints on their ability to invest in infrastructure is particularly imperative in Africa given that the demand for infrastructure is anticipated to increase considerably in the coming years to meet the needs of a growing population and larger urbanization of our major cities. Actually, African cities are expected to grow by 40% between 2010 and 2020, increasing the pressure on existing urban infrastructure. The World Bank (2009), estimated that this infrastructure deficit is holding back African economic growth by 2% per annum.

For Africa, this challenge is immense and complex and it constitutes a major constraint on Africa’s promising economic renaissance. Numerous studies and reports conducted by development partners and other institutions have shown that one of the biggest constraints to Africa’s growth and competitiveness has been fragmented, insufficient and underperforming infrastructure systems in terms of transport, ICT, energy and water. The infrastructure gap for Africa is estimated at USD 93 billion per annum (AICD, 2009). Finance remains a decisive constraint and will require multiple sources of funding. Different options of financing will be appropriate for various types of projects depending on the different sectors and social, legal and institutional arrangements. The funding can come from pension funds, insurance companies, banks, bond markets, sovereign wealth fund (Zoellick³, 2008), etc. Financing infrastructure needs will necessitate new thinking and new partnerships. Public, private, and mixed funding—such as public-private partnerships (PPP)—will all be necessary within and beyond Africa.

Currently, there is a lively debate on using the excess foreign exchange (forex) reserves of different African countries as one of the funding sources for financing infrastructure. According to IMF (1993), reserves are “external assets that are **readily available** to and **controlled by monetary authorities** for direct financing of external payment imbalances and to intervene in the exchange markets”. They are the result of the operations of the economic policy. They constitute a key indicator that estimates a country’s external economic relationships in terms of exports and capital inflow. In other words, they reflect the country’s international trade surpluses, foreign debt balance and foreign direct investment balance. According to Blackman’s seminal work (1982), foreign exchange reserves management is an

² Bank of England Handbooks (2001), No. 19 in page 10

³ “Today, sovereign wealth funds hold an estimated \$3 trillion in assets. If the World Bank Group can help create the platforms and benchmarks, the investment of even one percent of their assets would draw \$30 billion to African growth, development, and opportunity”

instrument of exchange rate policy in developed countries while it is a major national asset of economic development in developing countries.

Against this background, this paper deals with the following questions: what are the objectives of foreign exchange reserves management? Are they adequate? What are the innovative mechanisms to enhance their management? How much can be invested for financing infrastructure in Africa?

The present study highlights that in reserves management, the two goals of liquidity and return on investment can be reconciled by a more strategic targeting of the reserve portfolio to meet the demands of the liquidity portfolio and the investment portfolio respectively, while using different investment guidelines for each portfolio. Some experiences from emerging countries in using a portion of their excess forex reserves for economic investments funding have also been highlighted. In brief, we found that, collectively, foreign exchanges excesses from African countries are in the range of \$165.5 and \$193.6 billion in average per year, from 2000 to 2011. These amounts can meet the infrastructure financing gap of the continent (\$93 billion per year). Therefore, there may be room for creating investment vehicles for holding a part of assets as less liquid, higher-yielding wealth. This objective can be met through setting up appropriate investments vehicles to supplement the existing development partners, private and public sectors. The study also shows that the social cost of holding excess forex reserves, in the current modalities, could range of 0.35% to 1.67% on average in GDP terms.

The layout of this paper is as follows. The next section examines literature on the objectives of reserves management and provides a brief overview on the concepts of reserve adequacy and social cost of excess reserves. To extend the discussion in section 2 from an empirical perspective, section 3 provides empirical estimates of the optimal level of reserves based on two commonly used methods and investigates the social cost of holding excess reserves in African countries, from 2000 to 2011. Section 4 provides suggestions on how central banks can innovate in their reserves management based on experiences in other emerging economies and highlights various alternatives for investment vehicles for African forex reserves. Section 5 draws conclusions which can inform the investment of forex reserves for infrastructure in Africa.

2.0 Reserves Management and Adequacy

2.1 Reserves Management:

The debate related to the accumulation of foreign reserves is well developed in literature (Aizenman, et al., 2004; Aizenman and Marion, 2002; Bird and Rajan, 2003; Mendoza, 2004; Wijnholds and Kapteyn, 2001). Their objectives have been to explain how those reserves should be invested and managed. On one hand, a general view is that forex reserves are a valuable “war chest”⁴ against instability in financial markets (Feldstein, 1999; IMF, 2011). On the other hand, others have argued that reserves impose huge financial costs and that the reserve accumulation can reach excessive levels (Rodrik, 2006).

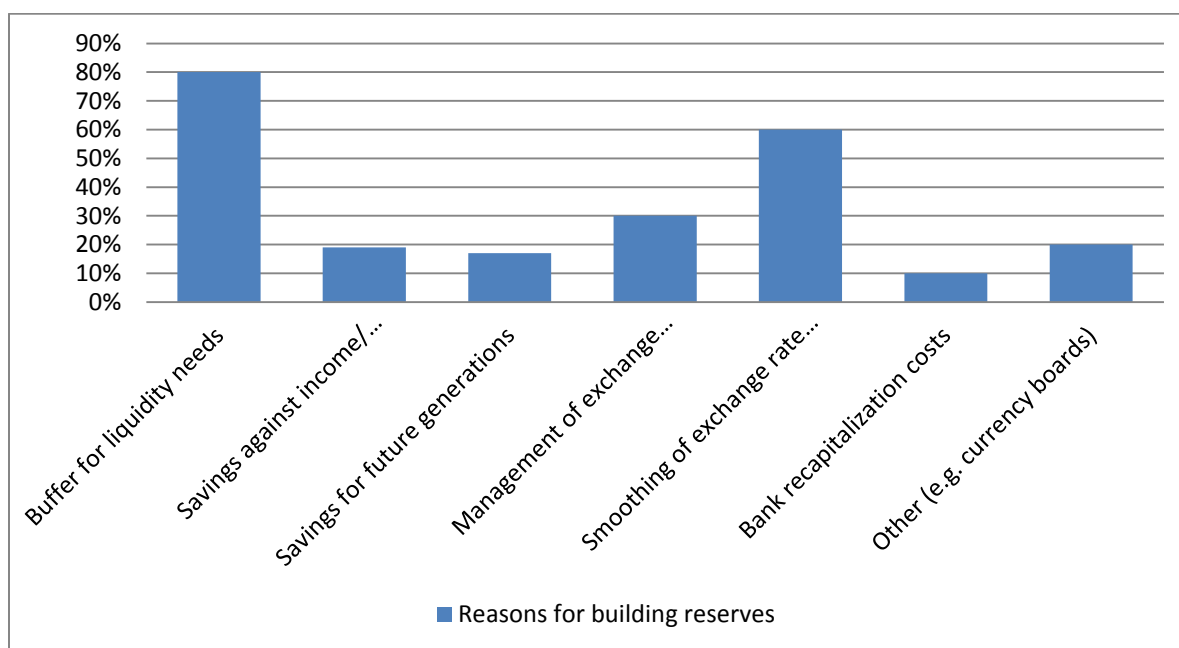
According to Gosselin and Parent (2005), the economic factors that determine forex reserve accumulation can be summarized as the following:

⁴ countries sought to keep a buffer of reserve assets to be able to deal with contingencies

- Economic size: To the extent that international transactions rise with economic size, reserves are expected to increase with population and real GDP per capita.
- Current account exposure: A given economy with significant trade linkages to external markets is more exposed to external shocks, so more trade openness would be linked with higher reserve holdings. Also, larger export volatility will require higher levels of reserves.
- Capital account vulnerability: Likewise economies with significant financial openness are linked to higher vulnerability to financial crises, a greater potential for resident based capital flight from the local financial market will thus, higher levels of reserves.
- Exchange rate flexibility: Greater flexibility eases the demand for reserves, given that central banks may no longer need a large stockpile of reserves to manage a pegged exchange rate. However, in reality, many countries that have adopted more flexible exchange rate regimes (including managed floats) do not allow for such variability.
- Social (or opportunity) cost: This is the difference between the yield on reserves and the marginal productivity of an alternative investment⁵.

In Figure 1 below, an IMF survey for reserves managers (2009) covering OECD, emerging countries and Africa, highlights that the main reason for building excess reserves include; buffer for liquidity needs, smoothing of exchange rate volatility and management of exchange rate level.

Figure 1: Reasons for Building Excess Reserves



Source: IMF survey of reserves managers (2009)

⁵ Economic theory forecasts that the higher the social cost of holding reserves the lower would be the demand for forex reserves

This survey depicts the greater emphasis on the objectives of “liquidity”, followed by “security and return”.

However, in discussing the subject of liquidity in reserves management, it is important to differentiate between cash management and liquidity management (Nugée, 2001). Cash management on one hand refers to the cash demands for routine operations, while liquidity management, and on the other hand refers to “the ability to provide large amounts of cash out of the reserves at short notice”. Consequently, the decision on how much liquidity to hold, and in what form, has become a more intricate one.

In 2011, the IMF World Economic Outlook estimated the total of foreign exchange reserves held by African countries at US\$ 512 billion compared to US\$ 10, 817 billion worldwide, i.e. Africa holds less than 5% of the world foreign reserves. Given these numbers and the discussions so far, there can be a plausible debate on the optimal size of reserves for African countries and how much of this money can be invested for better returns, for example in infrastructure.

This is more so, given observations by Elhiraika and Ndikumana (2007). Using data from 1979 to 2005, they found that the composition of African reserves highlights the high exposure of reserve holders to global financial risks. Their study showed that more than 95 per cent of African non-gold reserves were held in foreign exchanges comprising currency (mainly the US dollar) and deposits with monetary authorities and banks and securities (US/foreign government securities, equity, bonds and notes, money markets, derivatives). Consequently, the worth of African reserves is exposed to change with instabilities in the reserve currency (especially the US dollar) or broader international financial market volatilities.

In addition, the IMF survey (2009) showed that reserve buildup in developing countries is analogous to buildup of deficits in reserve asset countries, especially the US. Thus tunings in the US might have vital costs for the rest of the world, especially the reserve-accumulating countries.

In the following paragraphs, we provide a brief review of the different concepts including reserve adequacy, excess reserve and social cost of holding excess reserve

2.2 Reserves Adequacy

A voluminous literature from the late 1970s to date offers different method to measure the optimal level of reserves⁶.

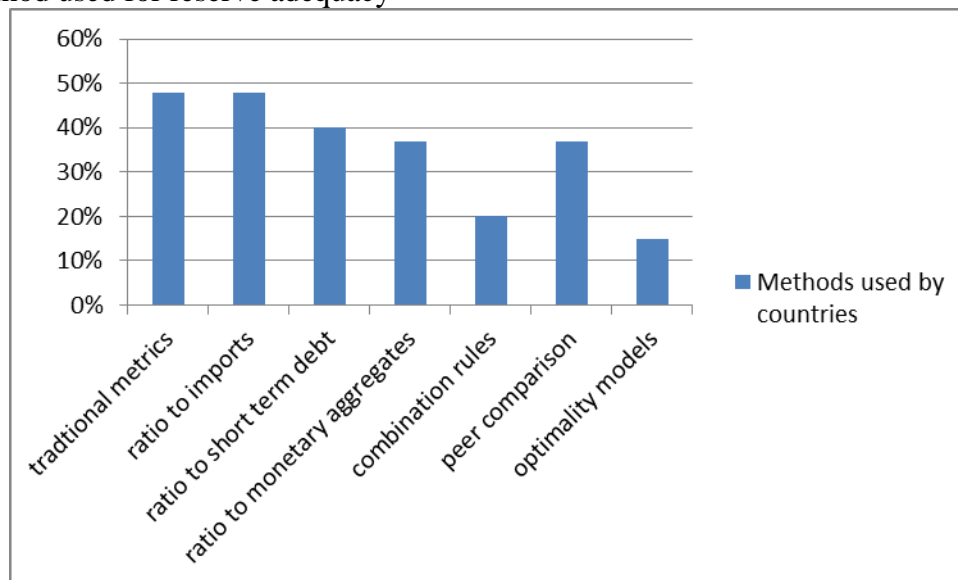
⁶ Triffin (1947) was probably the first to make specific reserve adequacy analysis, followed by Heller (1966) and Flanders (1971) academic contributions. Actually, Triffin (1947, 1960), Kenen and Yudin (1965), Flanders and Heller (1966) focused largely on the current account. They argued that the reserves/imports ratio could be taken as a measure of reserve adequacy. The key insights from that literature were later formalized in variants of the Baumol-Tobin (1952, 1956) inventory model in which the stock of reserves is being depleted by a stochastic current account deficit (see the contributions made by Frenkel and Jovanovic, 1981, and Flood and Marion, 2002). Actually, Heller (1966) was the first to use an international reserves demand model. It measured the opportunity cost of holding liquid foreign reserves as the gap between the social rate of return on capital and the return on the liquid foreign reserves held.

According to the IMF, in practice, a realistic foreign exchange reserves level should fulfill the following requirements:

- **The ratio of import cover (3-months)** (Triffin, 1947, 1960); or
- **The ratio of reserves to short-term foreign debt balance (Greenspan-Guidotti, 1999):** it measures a country’s capability of refunding debt quickly. The international benchmark is 1, which means 100%. It usually should not fall below 100%, which can guarantee that all the short-term foreign debt can be entirely repaid in a short time. The rule states that holding reserves enough to meet financial obligations due within one year’s time without having to depend on external sources should be sufficient to withstand significant external shocks.
- **The ratio of foreign exchange reserves to the total foreign debt balance** (Brown, 1964): This reflects a country’s ability to repay its total foreign debt balance with foreign exchange reserves, 40% is an optimal size; or
- **The ratio of foreign exchange reserves to Money & Quasi-money (M2)** (Machlup, 1966): It is used as a financial crisis precaution indicator. Since M2 indicates the liquidity of purchasing foreign assets for domestic institutions and individuals, it indicates the potential risk of asset transfer of domestic enterprises and individuals. The benchmark is within 10%-20% for countries maintaining a pegged exchange rate institution and a fixed exchange rate system; while the benchmark is within 5%-10% for countries maintaining a floating exchange rate system.

In Figure 2 below, an IMF survey of reserve managers (2009) illustrates the approaches used by countries to measure the adequacy of their reserves. Figure 2: Methods used by Countries to Estimate Foreign Reserve Adequacy

Figure 2: Method used for reserve adequacy



Source: IMF Survey of Reserve Managers

The figure illustrates that the traditional methods, in particular ratio to import cover, are the most used by countries in estimating the adequacy of foreign reserves. The survey results also show that two-thirds of economies surveyed, frequently use quantified techniques of costs in the cost-benefit framework, to advise their reserves strategy.

In 2001, Wijnholds and Kapteyn⁷ proposed a new criterion for estimating international reserve adequacy for emerging countries that could be considered as an extension of the money based and debt-based criteria, hereinafter referred as WK criterion. It consists of the following three components: (i) short-term debt by remaining maturity, (ii) fraction of M2 considered as an indicator of potential for capital flight in the country, (iii) and capital flight probability indicator. This method aims to capture two important risk factors, namely an “external drain” (as measured by debt based measures) and “internal drain”, or capital flight by residents. They pool the ratios mentioned above to formulate the following rule of thumb: a country’s level of reserves should at least cover its short-term external debt, and a portion of broad money, determined by the exchange rate regime and perceived country risk. This technique has been used widely in Bird and Rajan (2003). It has also been applied by IMF staff as stated in the section on Reserve Adequacy of Article IV (IMF). The formula can be written as:

$$R^* = E + a M.C \dots \dots \dots \text{Eqn. (1)}$$

Where:

- R* = adequate reserves,
- E= external short-term debt by residual maturity,
- a= fraction depending on the exchange rate regime (0.05 to 0.1 for floating regimes and 0.1 to 0.2 for intermediate regimes)⁸,
- M= broad money, and
- C= country risk index⁹.

2.3 Excess Reserves

Having discussed the methodologies used in estimating reserve adequacy, it is also in order to discuss the sources of reserves buildup. These reserves can come from Foreign Direct Investments (FDI); international borrowing; portfolio or banking inflows; etc. In this context, countries can be classified under 3 groups: (i) Countries with current account excess (ii) countries with capital account excess; and (iii) those that experienced both current and capital account excesses.

The two main reasons that lead to excess reserves are: i) when foreign borrowing by the central bank to increase gross reserves does not result in an expansion of the money supply whereas “borrowing” by the private sector does; ii) when the country receiving FDI inflows or portfolio inflows is not bearing an exchange rate risk associated with these types of “borrowing” and the country which is investing is bearing such risk. It should also be noted that, government and private sector bank borrowing involves

⁷ Results obtained using W-K Criterion can be verified using other approaches discussed in research papers such as Frenkel-Jovanovic; Aizenman and Marion (2003).

⁸ For our analysis, we take a=0.1 because it captures both the floating and the intermediate regimes

⁹ EIU Ratings are derived from scores as follows: 100-89 = D; 92-79 = C; 82-69 = CC; 72-59 = CCC; 62-49 = B; 52-39 = BB; 42-29 = BBB; 32-19 = A; 22-9 = AA; 12-0 = AAA. In boundary areas, the higher or lower rating is assigned at the discretion of the analyst. .

not only a direct interest cost but also leaves the country with an exchange rate risk associated with the borrowing (since the loan is likely to be denominated in foreign currency).

It is also notable that there is no direct causal link between huge current account excesses and reserve buildup; current account excesses will only result in foreign reserve buildup once combined with central bank interventions to prevent or mitigate an exchange rate appreciation. As pointed out by Wijnholds (2001), it's not the same whether these excesses are made as a consequence of "official" borrowing or as an effect of the private sector having attracted large amounts of FDI. So, in order to reduce precautionary demand for reserves, governments must encourage internal demand along with growth in exports and real GDP and strengthen domestic financial markets. Actually, deep and liquid domestic capital markets are the foundations for lasting economic growth. Local capital markets provide affordable, long-term finance for infrastructure and the financing needs of the private sector and a flourishing private sector provides the enabling opportunities for socio-economic advancement.

2.4 Social Cost of Holding Foreign Reserves:

The costs of maintaining reserves include the social cost of inevitable domestic consumption and investment as well as financial costs and the strain on monetary policy arising from struggles to sterilize the impacts of excessive monetary expansion through higher national interest rates. This can lead to increased fiscal pressure that make reserve buildup unaligned with fiscal policy objectives or reserve accumulation that may even disturb the macroeconomic policy framework (Elhiraika, 2007).

Rodrik (2000, 2006) and Bird et al. (2002) have proposed approaches to estimate social costs of holding excess reserves:

a) The social cost should be measured as the difference between the highest possible marginal productivity forgone from an alternative investment in fixed assets and the yield on international reserves. However, it is not possible to obtain such a measure for a large sample of developing countries. A less satisfactory but standard way of computing the social cost is by taking differential between the country's own-interest rate and the interest rate on U.S. Treasuries, and multiplying it by the excess reserve level;

b) Rodrik acknowledges the struggle in obtaining precise statistics on the private cost of short-term borrowing since they are not widely traded. The closest proxy is taken to be the Emerging Market Bond Index (EMBI) spreads. It is roughly reflected by a baseline of the JP Morgan Emerging Markets Bonds Index (EMBI) plus sovereign spread index that averaged 4.5% between 2000 and 2012 (Bianchi, 2013);

So far the discussion has focused on the concepts of foreign exchange reserve adequacy, excess reserve and social costs. In the subsequent section, the study will use the two methods described above to empirically estimate the adequate reserve foreign exchange reserves for African countries and the excesses as the difference in the size of the current reserves. Based on these estimates, the study will also derive the social cost (in GDP terms) of holding excess foreign exchange reserves.

3.0 Empirical Estimates of Adequate Reserve, Excesses and Social Cost

The study has relied on different databases to derive the reserve and to estimate the reserve adequacy for different African countries. Data on foreign reserves is extracted directly from the database while the adequacy level and excesses are derived from empirical methods. These databases include:

- **IMF, International Financial Statistics (IMF, 2000-2011)** for data on foreign exchange reserves and imports classified by country and year;
- **World Bank, World Development Indicators (WDI, World Bank, 2000-2011)** for data on annual GDP and short-term external debt stocks (debt maturing in less than a year), M2, countries;
- **World Economic Outlook (World Economic Outlook, 2011)** for data on the total annual reserves.

3.1 Estimating Adequacy Level and Excess Foreign Reserves:

For estimating the reserve adequacy and consequently the “excesses”, the study has used the following two approaches which are commonly used as indicated in previous sections:

1. Rodrik approach: The adequacy level is taken to be equal to the 3-months import benchmark while the excesses is take to be equal to amounts of reserves held above the 3-months of import benchmark. This approach is also the most used by countries as shown in figure 2 above;

$$\text{Excess Reserves} = \text{Total Annual Reserve} - 3\text{-months import Reserves} \dots\dots\dots \text{Eqn. (2)}$$

2. WK (2001) adequate reserve calculation above. It’s also widely used by IMF staff in the article IV

$$\text{Excess reserves} = \text{Total Annual Reserve} - R^* \dots\dots\dots \text{Eqn. (3)}$$

3.2 Estimating Social Cost

For estimating the social cost of holding excess reserve, the study has built on the works of Rodrik (2000, 2006) and Bird et al. (2002) and calculated the social cost of holding these excesses reserves in GDP term. In the present study, the annual social cost of excess reserves (% of GDP) is calculated by multiplying the excess reserve level (% of GDP) by the JP Morgan Emerging Markets Bonds Index (EMBI) plus sovereign spread index.

$$\text{Social cost} = (\text{Excess reserves}/\text{GDP}) * \text{EMBI Spread} \dots\dots\dots \text{Eqn. (4)}$$

The AfDB’s infrastructure portfolio investment average yield (4.85%) and the baseline return on African Development Bank’s private equity infrastructure funds (10%)¹⁰ have been used as

¹⁰ Very conservative

comparative indices to highlight indicative yields on alternative investments to holding excess foreign reserves.

4.0 Results and Discussion

The following tables show results obtained from the empirical estimates employed in the study. The tables show the reserves from the database, the estimated adequacy level, excess reserve in GDP terms, social cost of holding the excess reserve and other comparative proxies as described above.

Table 1 shows results from estimating reserve adequacy based on Rodrik's method and Table 2 shows results from estimating reserve adequacy based on WK's method.

Table 1: Results Based on Rodrik's Method (Social Cost in Percentage of GDP in 2011)

Country Name	Excess reserves/GDP=Rgdp	social cost (% GDP)		
		Rgdp*EMBIG spread	Rgdp*AfDB infra pF	Rgdp*AfDB ROI
Algeria	93,4%	4,2%	4,53%	9,34%
Angola	12,5%	0,6%	0,61%	1,25%
Benin	5,0%	0,2%	0,24%	0,50%
Botswana	36,3%	1,6%	1,76%	3,63%
Burkina Faso	4,4%	0,2%	0,21%	0,44%
Burundi	4,2%	0,2%	0,20%	0,42%
Cameroon	3,8%	0,2%	0,19%	0,38%
Cape Verde	-1,5%	-0,1%	-0,07%	-0,15%
Congo, Rep.	24,4%	1,1%	1,19%	2,44%
Cote d'Ivoire	6,5%	0,3%	0,31%	0,65%
Djibouti	6,5%	0,3%	0,31%	0,65%
Egypt, Arab Rep.	0,7%	0,0%	0,03%	0,07%
Equatorial Guinea	8,1%	0,4%	0,39%	0,81%
Eritrea	-0,5%	0,0%	-0,02%	-0,05%
Gabon	7,7%	0,3%	0,37%	0,77%
Gambia, The	13,9%	0,6%	0,68%	1,39%
Ghana	1,8%	0,1%	0,09%	0,18%
Guinea-Bissau	14,5%	0,7%	0,70%	1,45%
Kenya	0,3%	0,0%	0,02%	0,03%
Libya	160,2%	7,2%	7,77%	16,02%
Madagascar	1,1%	0,0%	0,05%	0,11%
Malawi	-9,3%	-0,4%	-0,45%	-0,93%
Mali	5,2%	0,2%	0,25%	0,52%
Mauritania	2,1%	0,1%	0,10%	0,21%
Mauritius	-5,4%	-0,2%	-0,26%	-0,54%
Morocco	7,5%	0,3%	0,36%	0,75%
Mozambique	6,1%	0,3%	0,30%	0,61%
Namibia	0,1%	0,0%	0,00%	0,01%
Niger	-9,9%	-0,4%	-0,48%	-0,99%
Nigeria	3,6%	0,2%	0,17%	0,36%
Rwanda	9,8%	0,4%	0,48%	0,98%
Sao Tome and Principe	5,7%	0,3%	0,28%	0,57%
Senegal	3,9%	0,2%	0,19%	0,39%
Seychelles	-8,7%	-0,4%	-0,42%	-0,87%
Sierra Leone	-1,9%	-0,1%	-0,09%	-0,19%
South Africa	3,7%	0,2%	0,18%	0,37%
Sudan	-0,2%	0,0%	-0,01%	-0,02%
Swaziland	-4,2%	-0,2%	-0,20%	-0,42%
Tanzania	3,5%	0,2%	0,17%	0,35%
Togo	8,4%	0,4%	0,41%	0,84%
Tunisia	3,9%	0,2%	0,19%	0,39%
Uganda	4,0%	0,2%	0,19%	0,40%
Zambia	0,1%	0,0%	0,00%	0,01%

Source: Authors' calculation

Based on this Rodrik’s method, the countries accumulating more excess reserves in percentage of GDP are:

- (i) Algeria (from 18.7% in 2000 to 93.4% in 2011);
- (ii) Botswana (from 98.6% in 2000 to 36.3% in 2011),
- (iii) Libya (from 36% in 2000 to 160.2% in 2011) and
- (iv) Nigeria (from 13.6% in 2000 to 3.6% in 2011).

Algeria, Botswana, and Libya have the highest social cost in percentage of GDP. On average, for the entire database, the “excess reserves” in percentage of GDP went from 2.8% in 2000 for the 43 countries to 10% in 2011. The excess reserves represent a total amount of USD 350 billion in 2011 over USD 512 billion available for the entire continent (i.e. 68%). The yearly net excess reserves averaged \$ 193.6 billion between 2000 and 2011.

Table 2: Results Based on WK’s Method (Social Cost in Percentage of GDP in 2011¹¹)

Country Name	Excess reserves/GDP=Rgdp	social cost		
		EMBIG	AfDB infra pF	AfDB ROI
Algeria	97,85%	4,40%	4,75%	9,78%
Angola	29,36%	1,32%	1,42%	2,94%
Botswana	43,10%	1,94%	2,09%	4,31%
Cameroon	11,20%	0,50%	0,54%	1,12%
Cote d'Ivoire	12,16%	0,55%	0,59%	1,22%
Egypt, Arab Rep.	2,30%	0,10%	0,11%	0,23%
Gabon	10,63%	0,48%	0,52%	1,06%
Ghana	6,38%	0,29%	0,31%	0,64%
Kenya	4,64%	0,21%	0,22%	0,46%
Malawi	1,00%	0,05%	0,05%	0,10%
Morocco	11,92%	0,54%	0,58%	1,19%
Nigeria	11,39%	0,51%	0,55%	1,14%
Senegal	11,68%	0,53%	0,57%	1,17%
South Africa	4,43%	0,20%	0,21%	0,44%
Tunisia	6,89%	0,31%	0,33%	0,69%

Source: Authors’ with AfDB, World Bank and IMF data

The following countries have structural excess reserves in percentage of GDP over the period according to WK methodology: Algeria, Angola, Botswana, Egypt, Malawi, Morocco, Nigeria and Senegal. From 2000 to 2011, the excess reserves represent 66% in Algeria, 71% in Botswana, 29% in Angola, 19% in Morocco and 17% in Nigeria.

Based on the conceptual premises of the WK method, these results show that the level of reserve far exceed the level required to mitigate potential capital flight. This excess reserve level is more than the total amount required to finance African infrastructure. All the countries have had excess foreign

¹¹ Data was only available for 15 countries. In the EIU dataset on country risk, only few countries are rated. Our database comprises 15 countries (table 2) which account for USD 302 billion reserves i.e. around 60% of total available African reserves in 2011.

reserves since 2009. The yearly net average total excess reserves are USD 165.5 billion between 2000 and 2011. The social cost is higher in Algeria, Botswana, and Angola than in the other African countries.

The results also show that economies driven by commodities exports have the highest social cost in percentage of GDP (Algeria, Angola, Botswana, Cote d’Ivoire, Cameroon, Senegal, and Nigeria). Furthermore, more diversified economies such as South Africa, Mauritius, Kenya, Egypt and Tunisia, have the lowest social cost.

Using the two approaches and the different alternatives investments opportunities above, the study also shows that the social cost of holding excess forex reserves could range between 0.35% to 1.67% in average in GDP terms, between 2000 and 2011.

In Table 3, the results of the empirical estimations have been summarized and presented in average terms.

Table 3: Summary of Findings:

Methods	Average Reserve (USD billion)	Average Adequacy Level (USD billion)	Average Excess (USD billion)	Average EMBIG (%)	Average AfDB Infra PF (%)	Average AfDB ROI(%)
1. Rodrick	293.5	99.9	193.6	4.5	4.85	10
2.WK	216	50.5	165.5	4.5	4.85	10

Source: Authors’ calculation

In brief, following the two commonly used methods used in calculating reserve adequacy, it is clear that excess foreign reserves held by African countries can meet the infrastructure financing needs of the continent which has been estimated at **\$93 billion per annum** (AICD, 2009). Investing just about 30% of the excess reserves (\$165 or \$193 billion) in investment vehicle for infrastructure will go a long way in meeting the financing needs of infrastructure in the continent. These findings echo the position of Stiglitz (2006) who underscored that the total social cost of holding excess reserves is around \$ 300 billion per year in developing countries, which is approximately equal to the amount of resources needed by developing countries to fund basic investments to meet the MDG.

In addition, the IMF 2012 report on reserve adequacy analysis for Central African Economic and Monetary Community (CEMAC), over the past 20 years and using traditional metric, found that the reserve adequacy for the region as a whole looks sufficient, advising there is room for creating a regional fund for holding a portion of assets as less liquid, higher-yielding wealth.

These figures should be an eye opener.

Furthermore, the findings as presented in Tables, 1, 2, and 3 show that investing in the AfDB infrastructure portfolio or African private equity infrastructure funds would have earned more revenues for African countries in general in comparison to holding these excess reserves in their current forms. It is therefore arguable, that by channeling the yearly excess reserves to finance infrastructure, the continent will reduce the social cost of holding excess reserves for its economies.

The results presented so far, also point to the need for a more strategic framework in determining the use of foreign reserves which can be invested in different alternative assets including OECD treasury bills and other economic investments needs (infrastructure, property, private equity, etc.). Such a framework should necessarily include the following steps:

- Evaluation of reserve adequacy based on one or a combination of methods including the traditional method such as 3-months imports cover ratio; , WK reserve adequacy method and others etc.
- Calculation of the social cost of accumulation of excess reserves in GDP terms
- Determination of percentage of foreign reserves to invest in economic investments needs.

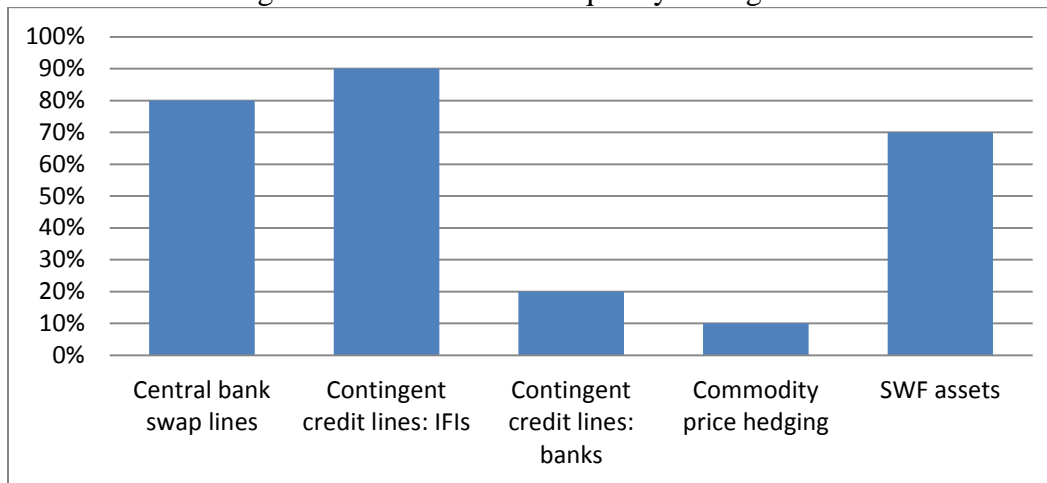
These findings also indicate that African countries with excess reserves should apply active debt management and diversification; implement sound macroeconomic policies focusing on public investments; strengthening the domestic financial sector; and support the export of non-commodities products.

The subsequent section of the study will dwell on some suggestions on how central banks can innovate in their reserves management and propose various investment vehicles for African central banks reserves.

4.1 Liquidity enhancement

Since the 90's the capacity of central banks to manage either their routine liquidity requirements (cash management) or a speculative attack on their exchange rate has been largely enhanced. Actually, there is a much wider range of methods available for intervention purposes and liquidity funding. Now, central banks can collateralize their resources or use repurchase agreements (Repo's) to fund liquidity at short notification, without having to pay huge amounts of securities; and central banks may also include currency forwards and options to their list of financial instruments to defend their currency. Also, a range of bilateral or multilateral agreements have been put in place such as credit lines or swap lines among central banks to reinforce foreign exchange reserves. As experienced during the recent financial crisis, highly liquid foreign reserves are no longer the core or sole tool for navigating a currency crisis (Figure 6). Thus, holding a high percentage of highly liquid assets is no longer always the most appropriate approach. In fact, according to IMF Capital Market Department et al., (2011); in limited special circumstances, non-convertible currencies (not calculated as reserves) could be more applicable than foreign reserve currencies from the balance of payment perspective.

Figure 6: Instruments for liquidity management



Source: IMF Survey of Reserve Managers (2009)

The chart shows that the most used instruments include: contingent credit lines; central bank swap lines and sovereign wealth funds' assets. However, it's notable that big central banks tend to extend swap lines only to those economies with which they have solid trade and financial relations, and which they consider adequately creditworthy. This means that most of the developing countries would not have access to swap facilities.

In the views of Cassard *et al.* (1997), the two goals; liquidity and return, can be reconciled by dividing the reserves portfolio into a **liquidity portfolio** and an **investment portfolio**, and using different investment guidelines for each portfolio. The rationale of this proposal is that the liquidity portfolio which would be targeted at regular disbursements and unanticipated liquidity demand and for intervention objectives would be invested mostly in highly liquid and safe assets such as the money markets of the OECD countries. However, the investment portfolio would comprise a wider set of economic investments products and maturities, and would use investment criteria akin to those of big institutional and pension funds managers.

In addition, as pointed out by the IMF Capital Market Department *et al.*, (2011), since reserve management can improve a country's capability to deal with a crisis, therefore proper domestic institutional arrangements and practices are needed to moderate the exposure of such reserves. In this context, the main areas of concern will include; public debt management and prudential regulation that deal with private sector engagements. A proper debt management strategy can ease the probability that servicing public debt could end in calls on official reserves. Public debt in various African countries includes a huge foreign currency part, leaving the economy unprotected to foreign currency risks and—less obviously—to an increase in foreign interest rates. Short maturities of foreign debt further compound these risks. A possible approach to this situation is to rely on asset and liability management (ALM) methods that could be used to coordinate the risk profile of reserves and public debt. For example matching the currency structure of reserves with that of short-term foreign debt can moderate overall financial risks and consequently the exposures of the economy. This will require a close

collaboration between the central bank and the debt management office on the alignment of foreign reserves and foreign debt for a successful ALM implementation.

The following discussions outline some experiences from emerging countries in using a portion of their foreign exchange reserves for economic investments funding.

4.2 International experiences in using forex reserves for economic investments

Table 4: Emerging Countries Experiences in using Excess Forex Reserves for Economic Investments:

Asia	
Singapore	<p>Their reserves are managed by three agencies: the Government of Singapore Investment Corporation (GIC), Temasek Holdings (Temasek) and the Monetary Authority of Singapore (MAS).</p> <p>GIC is one of the leading investment management organizations in the world, financing well over US\$100 billion in multiple asset classes in more than 40 countries. It was incorporated in 1981 under the Singapore Companies Act. Their responsibility is to preserve and enhance Singapore’s foreign reserves</p>
Korea	<p>Korea Investment Corporation (KIC) was launched with a view to boost sovereign wealth and fund to the development of the domestic financial industry.</p> <p>KIC is assigned to manage assets entrusted by the Government and the Central Bank of Korea. It functions as the main vehicle for overseas investment of excess public funds such as foreign exchange reserves, pension funds, and proceeds from privatization.</p>
China	<p>China Investment Corporation (CIC) is an investment institution recognized as an exclusively state-owned company under the Company Law of the People’s Republic of China. Its mission is to make long-term investments that maximize risk adjusted financial returns for the benefit of the Government. Their foreign investment portfolio is largely composed of equity, fixed income and alternative assets, in both developed and emerging markets.</p>
Kuwait	<p>The Kuwait Investment Authority (KIA) is the oldest sovereign wealth fund in the world. It’s accountable for the management and admin of Kuwait’s General Reserve Fund (GRF) and its Future Generations Fund (FGF), as well as all other funds assigned to it by the Minister of Finance for and on behalf of the State of Kuwait. The GRF is the repository of all of the State of Kuwait’s oil revenues and income earned from GRF investments which are comprised of the general reserves of the State of Kuwait.</p>
Emirate of Abu Dhabi	<p>The Abu Dhabi Investment Authority (ADIA) is a</p>

	worldwide diversified investment organization that is exclusively owned by their Government and it was established in 1976. ADIA manages a diversified world-wide investment portfolio across more than two-dozen asset classes and sub-categories, including quoted equities, fixed income, real estate, private equity, alternatives and infrastructure. The massive quantity of wealth managed by the ADIA is sourced mostly from Abu Dhabi's large oil reserves.
Latin America experiences	
Mexico	Oil Revenues Stabilization Fund was founded in 2000. It's the oldest in the region and holding around \$6 billion in assets.
Chile	Social and Economic Stabilization Fund holds around \$21.8 billion in assets made from copper revenues.
Peru	Is currently building its own sovereign fund, molded on Chile's, to hold profits from production of silver and copper
Colombia	contemplates also to create an oil stabilization fund in the near future
Brazil	The Sovereign Fund is a non-commodity fund with around \$11.3 billion in assets.

Source: Authors' based on governments reports

The Sovereign investment vehicles can be summarized as follows: 1) Stabilization Funds; 2) Savings Funds; 3) Public pension reserve funds; 4) Government Investment Funds; 5) Government Development Funds; and 6) State-owned enterprises.

In Africa, according to Triki and Faye (2011), there are about 15 Sovereign Wealth Funds (SWF). Among the five (5) largest African SWFs, four (4) are generated from oil and gas revenues and one from diamonds and minerals. Since 2012, Africa's second-largest crude producer, Angola has launched a \$5 billion sovereign wealth fund, Angolan Sovereign Fund (FSA), to invest in domestic and overseas assets while channeling vast oil wealth into infrastructure, hotels, financial securities and other high-growth projects. According to their study, these SWFs are characteristically small and essentially aiming on accomplishing stabilization goals. Their institutional arrangement and management are poor and opaque. In addition, there is a fear expressed by recipient countries on the risk that some African SWFs' could pursue "noncommercial" objectives.

In view of these characteristics, a plausible approach would be the establishment of a regional or pan-African body that will coalesce and manage a portion of the surpluses of foreign reserves from different African countries in a manner that will meet the envisaged goals of good economic and financial returns.

In the next paragraphs, we will discuss different options in using foreign exchange surpluses for financing infrastructure in Africa.

4.3 Options on Investment Vehicles

In the table 5 below, we summarize the features of various potential options on investment vehicles:

Table 5: Options on Investment Vehicles

	Description	comments
Option 1: African Infrastructure Fund ¹²	The capital structure could include equity by the African countries members and Multilateral banks, and debt which is expected to be held by different investors comprising the African central banks and SWFs	The main issues related to risks are: <ul style="list-style-type: none"> • Delay in equity contributions; • Difficulties in attaining a high investment grade credit rating; • Challenges in attracting buyers
Option 2: African Infrastructure Finance Facility ¹³	All capital needed for the three uses (Guarantee fund; Equity Fund; Project Preparation Fund) are raised in one vehicle by issuing equity and bonds. The equity could be funded by AfDB and African countries or their central banks, and will act as a level of security for the bond holders.	Advantages: “Administratively easier than performing fundraising exercises for a number of funds simultaneously.” Disadvantages: “The establishment of a credit rating will depend on the establishment of a successful track record, which will take time to achieve.”
Option 3: Regional Equity Funds ¹⁴	It will operate as a Regional Investment Corporation wholly owned by central banks and countries of a target sub region	Advantages: it will target infrastructure only and will be driven by return and regional economic impact Disadvantages: inopportunity to leverage on countries with excess liquidity to support low income and fragile states
Option 4: new multilateral Bank ¹⁵	Another multilateral institutions with a focus on infrastructure investments	<ul style="list-style-type: none"> • This may entail voluminous negotiation, planning, and implementation would be lengthy; • The need to form a credible track record to guarantee trust and confidence among member stakeholders; • The overall cost of borrowing could be higher; • Challenging to build an adequate knowledge base and expertise.
Option 5 : other	<ul style="list-style-type: none"> • BRICS Bank initiative • World Bank initiative 	These initiatives should enhance opportunities for partnerships with

¹² Build on Asian Infrastructure Fund business model

¹³ See AfDB presentation in Tokyo 2012. It has been endorsed by African Ministers of Finance during the 2013 Annual Meetings in Marrakech, and the new named is Africa50Fund, discussions ongoing about its structure.

¹⁴ See author, 2012

¹⁵ Bhattacharyay, 2010

	<i>targeting Middle Income countries</i>	existing institutions.
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Source: Authors' Compilation

In all the cases of investment vehicles described above, it is evident that there is an opportunity for more investment institutions in Africa to finance its development needs. However, any of such investment vehicle(s) should also be characterized by the following in comparison to other existing vehicles:

- Focus on economic infrastructure projects with a regional impact;
- Focus on innovative mechanisms for cross-border infrastructure investments;
- Encourage quick handling interventions: more flexible rules, systems and procedures;
- Deal with political risk, credit risk, and refinancing risk;
- Manage a portion of African countries' surpluses forex;
- Better customization and sophisticated methods to meet the specific needs of beneficiary countries.

4.3 Way forward:

The African Development Bank and other development partners intervening in Africa could set up the following mechanisms to safeguards such investments vehicles by:

- setting-up a kind of Emergency Liquidity Facility¹⁶ mechanism for countries participating in the pan African investment vehicle;
- providing stand-alone¹⁷ derivative products for participants countries;
- facilitating access to swap lines for some African countries;
- strategies to enhance liquidity of the investment vehicle securities¹⁸;
- providing a cross-default arrangement through a complementary financing (A/B loan) structure.

5.0 Recommendations and Conclusion

The literature review has highlighted that in reserves management, the two goals of liquidity and returns can be reconciled by dividing the reserves portfolio into a **liquidity portfolio** and an **investment portfolio**, and using different investment guidelines for each portfolio. Some experiences from emerging countries in using a portion of their foreign exchange reserves for economic investments funding have also been highlighted.

The study has also shown that social cost of holding excess reserves is considerably high in many African countries between 2000 and 2011 and more so for commodity export dependent economies.

¹⁶ See Akin-Olugbade 2009 presentation to the AfDB Board

¹⁷ The derivative product will not be condition to the underlying transaction but to the overall relation with the counterparty.

¹⁸ Regular issuance; dealer support to facilitate market-making; optimal allocation to broaden investor base, etc.

The study also shows that based on the two methods of reserve adequacy applied, that African foreign exchanges excess can meet the infrastructure financing gap of the continent. There is room for creating investment vehicles for holding a part of assets as less liquid, higher-yielding wealth.

Such envisaged investments vehicles should be put in place to complement existing development partners, private and public sectors while focusing on the following:

- Focus on economic infrastructure projects with a regional impact;
- Focus on innovative mechanisms for cross-border infrastructure investments;
- Encourage quick handling interventions (more flexible rules, systems and procedures);
- Deal with political risk, credit risk, and refinancing risk;
- Manage a portion of African countries' surpluses foreign exchange reserves; and better customization and sophisticated methods to come across countries' needs.

In addition, contrary to existing practices, foreign reserves management should feature performance accountability criteria that will encourage more focus on the diversification of objectives and investment alternatives. It should be kept in mind that the most important elements of successful reserves management are: a sound macroeconomic and prudential policy framework, low and viable levels of public debt. In addition, monetary and exchange rate policies that preserve both low inflation and near equilibrium exchange rates, as well as active regulation that confines contingent risks from the financial sector are all aspects that will considerably moderate the likelihood of a crisis.

Looking forward, the analysis presented in this study suggests several avenues for further research. For instance, it would be interesting to study further the social cost of maintaining the FCFA convertibility in the 14 African countries. In addition, analysis applied for reserve adequacy reserve levels have focused mainly on adequacy from a debt management perspective, it will also be beneficial to investigate the adequacy analysis from the perspective of expected profit returns on FDIs and how this can affect the level of excess reserves. This is given the rational, that all governments, in order to attract foreign investment, must provide adequate comfort to protect a foreign investor's principal and expected yield.

More broadly, this paper obviously shows that reserve adequacy analysis for commodity exporters in general and oil exporters in particular may involve further research. In the context of the current resource boom, African countries need to have a new mindset to diversify their income sectors, asset and security holdings and to engage more strategically in priority productivity-enhancing public investments.

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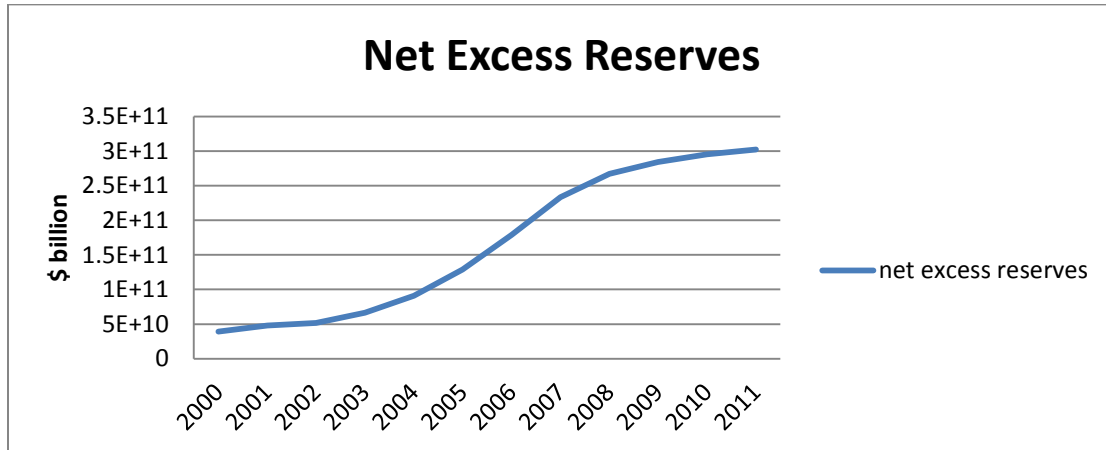
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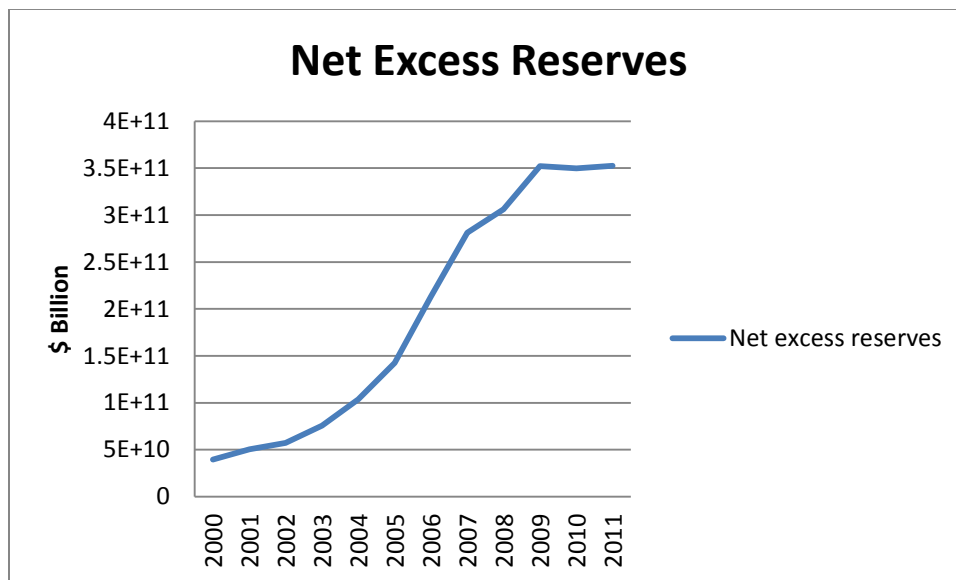
Annexes

Figure 4: Net Excess Reserves (WK method)



Source: Authors'

Figure 5: Net Excess Reserves (Import Cover Method)



Source: Authors' with data from AfDB, Worldbank and IMF

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